S T S L A B

FCC SAR TEST REPORT

Report No: STS1609065H01

Issued for

Shenzhen Jingwah Information Technology Co., Ltd.

4F, Bldg 4, Jinghua Square, No.1 Huafa North Road, Futian District, Shenzhen, China

Product Name:	Tablet PC
Brand Name:	N/A
Model Name:	M1015GR
Series Model:	Makka i103G
FCC ID:	RBD-M1015GR
Test Standard:	ANSI/IEEE Std. C95.1
	FCC 47 CFR Part 2 (2.1093)
	IEEE 1528: 2013
Max. Report SAR (1g):	Body:1.148 W/kg

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Test Report Certification

Applicant's name ..... : Shenzhen Jingwah Information Technology Co., Ltd.

Address ..... : 4F, Bldg 4, Jinghua Square, No.1 Huafa North Road, Futian District, Shenzhen, China

Manufacture's Name..... : Shenzhen Jingwah Information Technology Co., Ltd.

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Product description

Product name ..... : Tablet PC

Trademark ..... : N/A

Model and/or type reference : M1015GR

Series Model : Makka i103G

Standards..... : ANSI/IEEE Std. C95.1-1992
FCC 47 CFR Part 2 (2.1093)
IEEE 1528: 2013

The device was tested by Shenzhen STS Test Services Co., Ltd. in accordance with the measurement methods and procedures specified in KDB 865664 The test results in this report apply only to the tested sample of the stated device/equipment. Other similar device/equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Date of Test ..... :

Date (s) of performance of tests..... : 18 Sep. 2016

Date of Issue..... : 19 Sep. 2016

Test Result..... : **Pass**

Testing Engineer : Allen Chen

(Allen Chen)

Technical Manager : John Zou

(John Zou)

Authorized Signatory : Bovey Yang

(Bovey Yang)

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1.General Information

Environmental evaluation measurements of specific absorption rate (SAR) distributions in emulated human head and body tissues exposed to radio frequency (RF) radiation from wireless portable devices for compliance with the rules and regulations of the U.S. Federal Communications Commission (FCC).

1.1 EUT Description

Equipment	Tablet PC		
Brand Name	N/A		
Model No.	M1015GR		
Series Model	Makka i103G		
FCC ID	RBD-M1015GR		
Model Difference	Only different in model name		
Adapter	N/A		
Battery	Rated Voltage: 3.7V; Charge Limit: 4.2V; Capacity: 7000mAh		
Device Category	Portable		
Product stage	Production unit		
RF Exposure Environment	General Population / Uncontrolled		
IMEI	354695078622486 354695078622494		
Hardware Version	S10RJR110-R23C		
Software Version	N/A		
Frequency Range	GSM 850:824.2~848.8MHz PCS1900:1850.2~1909.8MHz WCDMA Band II:1852.4~1907.6MHz WCDMA Band V:826.4~846.6MHz WLAN 802.11b/g/n(HT20):2412~2462MHz Bluetooth:2402~ 2480MHz		
Max. Reported SAR(1g): (limit:1.6 W/kg)	Band	Mode	Body Worn and Hotspot(W/kg)
	PCE	GSM 850	1.135
	PCE	GSM 1900	1.133
	PCE	WCDMA Band II	1.148
	PCE	WCDMA Band V	0.980
	DTS	WIFI	0.195
	DSS	Bluetooth[Note]	0.005
Max Simultaneous Transmission			1.343
Max. Reported SAR(1g): (limit:1.6 W/kg)	Band	Mode	Body with protection shell
	PCE	GSM 850	1.013
	PCE	GSM 1900	1.043
	PCE	WCDMA Band II	1.056
	PCE	WCDMA Band V	0.786
	DTS	WIFI	0.102
Max Simultaneous Transmission			1.251
FCC Equipment Class	Licensed Portable Transmitter Held to Ear (PCE) Part 15 Spread Spectrum Transmitter (DSS) Digital Transmission System (DTS)		
Operating Mode:	GSM: GSM Voice; GPRS; EGPRS Class 12; WCDMA:RMC,HSDPA,HSUPA Release 6; WLAN: 802.11 b/g/n(HT20); Bluetooth: V3.0 + EDR (GFSK, π/4DQPSK, 8DPSK) ; Bluetooth: V4.0		

Antenna Specification:	GSM,WCDMA: PIFA Antenna BT,WIFI: PIFA Antenna
SIM Card	Support dual-SIM, dual standby, the multiple SIM card with two lines cannot transmitting at the same time
Hotspot Mode:	Support
DTM Mode:	Not Support

Note:

1. Bluetooth SAR was estimated
2. The dual SIM card mobile has 2 SIM slots and supports dual SIM dual standby. The WWAN radio transmission will be enabled by either one SIM at a time (Single active)
3. After pre-scan two SIM cards power, we found test result of the SIM1 was the worse, so we chose SIM1 card to perform all tests.
4. The EUT battery must be fully charged and checked periodically during the test to ascertain uniform power

1.2 Test Environment

Ambient conditions in the SAR laboratory:

Items	Required	Actual
Temperature (℃)	18-25	22~23
Humidity (%RH)	30-70	55~65

1.3 Test Factory

Shenzhen STS Test Services Co., Ltd.
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CNAS Registration No.: L7649;
FCC Registration No.: 842334;
IC Registration No.: 12108A-1

2.Test Standards And Limits

No.	Identity	Document Title
1	47 CFR Part 2	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
2	ANSI/IEEE Std. C95.1-1992	IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz
3	IEEE Std. 1528-2013	Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
4	FCC KDB 447498 D01 v06	Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies
5	FCC KDB 865664 D01 v01r04	SAR Measurement 100 MHz to 6 GHz
6	FCC KDB 865664 D02 v01r02	RF Exposure Reporting
7	FCC KDB 941225 D01 v03r01	SAR Measurement Procedures for 3G Devices
8	FCC KDB 941225 D06 v02r01	Hotspot Mode SAR
9	FCC KDB 648474 D04 v01r03	SAR Evaluation Considerations for Wireless Handsets
10	FCC KDB 248227 D01 Wi-Fi SAR v02r02	SAR Considerations for 802.11 Devices

(A). Limits for Occupational/Controlled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.4	8.0	20.0

(B). Limits for General Population/Uncontrolled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.08	1.6	4.0

NOTE: Whole-Body SAR is averaged over the entire body, partial-body SAR is averaged over any 1 gram of tissue defined as a tissue volume in the shape of a cube. SAR for hands, wrists, feet and ankles is averaged over any 10 grams of tissue defined as a tissue volume in the shape of a cube.

Population/Uncontrolled Environments:
are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure.

Occupational/Controlled Environments:
are defined as locations where there is exposure that may be incurred by people who are aware of the potential for exposure, (i.e. as a result of employment or occupation).

NOTE

GENERAL POPULATION/UNCONTROLLED EXPOSURE

PARTIAL BODY LIMIT

1.6 W/kg

3. SAR Measurement System

3.1 Definition Of Specific Absorption Rate (SAR)

SAR is related to the rate at which energy is absorbed per unit mass in an object exposed to a radio field. The SAR distribution in a biological body is complicated and is usually carried out by experimental techniques or numerical modeling. The standard recommends limits for two tiers of groups, occupational/controlled and general population/uncontrolled, based on a person's awareness and ability to exercise control over his or her exposure. In general, occupational/controlled exposure limits are higher than the limits for general population/uncontrolled.

The SAR definition is the time derivative (rate) of the incremental energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dv) of a given density (ρ). The equation description is as below:

$$\mathbf{SAR} = \frac{d}{dt}\left(\frac{dW}{dm}\right) = \frac{d}{dt}\left(\frac{dW}{\rho dv}\right)$$

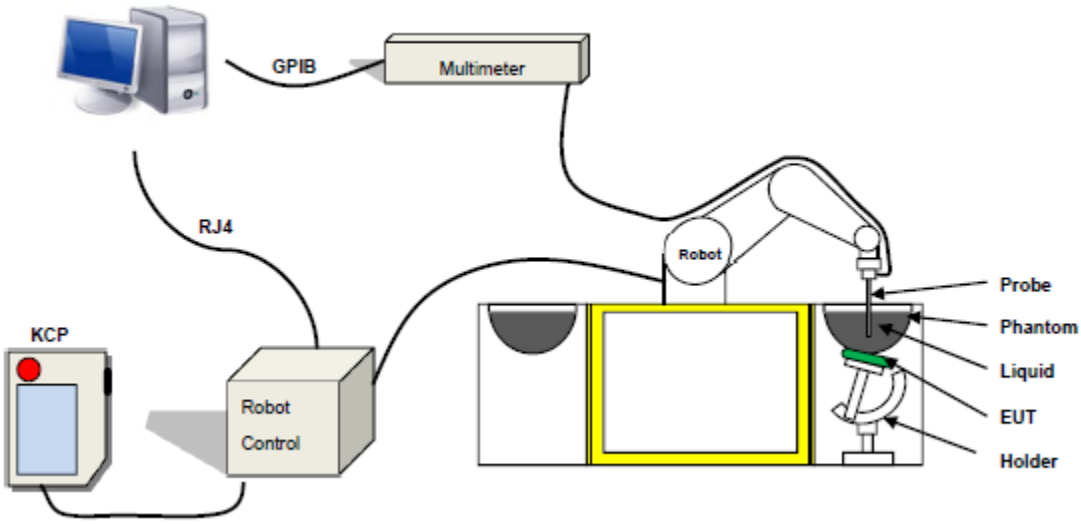
SAR is expressed in units of Watts per kilogram (W/kg) SAR measurement can be related to the electrical field in the tissue by

$$\mathbf{SAR} = \frac{\sigma E^2}{\rho}$$

Where: σ is the conductivity of the tissue,
ρ is the mass density of the tissue and E is the RMS electrical field strength.

3.2 SAR System

SATIMO SAR System Diagram:



Comosar is a system that is able to determine the SAR distribution inside a phantom of human being according to different standards. The Comosar system consists of the following items:

- Main computer to control all the system
- 6 axis robot
- Data acquisition system
- Miniature E-field probe
- Phone holder
- Head simulating tissue

The following figure shows the system.

The EUT under test operating at the maximum power level is placed in the phone holder, under the phantom, which is filled with head simulating liquid. The E-Field probe measures the electric field inside the phantom. The OpenSAR software computes the results to give a SAR value in a 1g or 10g mass.

3.2.1 Probe

For the measurements the Specific Dosimetric E-Field Probe SN 45/15 EPGO281 with following specifications is used

- Dynamic range: 0.01-100 W/kg
- Tip Diameter: 2.5 mm
- Length of Individual Dipoles: 2 mm
- Maximum external diameter: 8 mm
- Distance between dipoles / probe extremity: 2.7 mm (repeatability better than +/- 1mm)
- Probe linearity: 0±2.60%(±0.11 dB)
- Axial Isotropy: < 0.25 dB
- Spherical Isotropy: < 0.25 dB
- Calibration range: 450MHz to 6GHz for head & body simulating liquid.

Angle between probe axis (evaluation axis) and surface normal line: less than 30°

Figure 1 – *MVG COMOSAR Dosimetric E field Dipole*

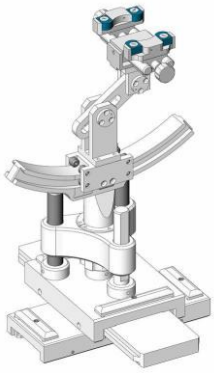
3.2.2 Phantom

For the measurements the Specific Anthropomorphic Mannequin (SAM) defined by the IEEE SCC-34/SC2 group is used. The phantom is a polyurethane shell integrated in a wooden table. The thickness of the phantom amounts to 2mm +/- 0.2mm. It enables the dosimetric evaluation of left and right phone usage and includes an additional flat phantom part for the simplified performance check. The phantom set-up includes a cover, which prevents the evaporation of the liquid.

Figure-SN 32/14 SAM115

Figure-SN 32/14 SAM116

3.2.3 Device Holder



The SAR in the phantom is approximately inversely proportional to the square of the distance between the source and the liquid surface. For a source at 5 mm distance, a positioning uncertainty of ± 0.5 mm would produce a SAR uncertainty of ± 20 %. Accurate device positioning is therefore crucial for accurate and repeatable measurements. The positions in which the devices must be measured are defined by the standards.

4. Tissue Simulating Liquids

4.1 Simulating Liquids Parameter Check

The head tissue dielectric parameters recommended by the IEEE SCC-34/SC-2 in P1528 have been incorporated in the following table. These head parameters are derived from planar layer models simulating the highest expected SAR for the dielectric properties and tissue thickness variations in a human head. Other head and body tissue parameters that have not been specified in P1528 are derived from the tissue dielectric parameters computed from the 4-Cole-Cole equations described in Reference [12] and extrapolated according to the head parameters specified in P1528.

Frequency (MHz)	Bactericide	DGBE	HEC	NaCl	Sucrose	1,2-Propanediol	X100	Water	Conductivity	Permittivity
	%	%	%	%	%	%	%	%	σ	εr
750	/	/	/	0.79	/	64.81	/	34.40	0.97	41.8
835	/	/	/	0.79	/	64.81	/	34.40	0.97	41.8
900	/	/	/	0.79	/	64.81	/	34.40	0.97	41.8
1800	/	13.84	/	0.35	/	/	30.45	55.36	1.38	41.0
1900	/	13.84	/	0.35	/	/	30.45	55.36	1.38	41.0
2000	/	7.99	/	0.16	/	/	19.97	71.88	1.55	41.1
2450	/	7.99	/	0.16	/	/	19.97	71.88	1.88	40.3
2600	/	7.99	/	0.16	/	/	19.97	71.88	1.88	40.3

Tissue dielectric parameters for head and body phantoms				
Frequency	ε_r		σ S/m	
	Head	Body	Head	Body
300	45.3	58.2	0.87	0.92
450	43.5	58.7	0.87	0.94
900	41.5	55.0	0.97	1.05
1450	40.5	54.0	1.20	1.30
1800	40.0	53.3	1.40	1.52
2450	39.2	52.7	1.80	1.95
3000	38.5	52.0	2.40	2.73
5800	35.3	48.2	5.27	6.00

LIQUID MEASUREMENT RESULTS

Date: 18 Sep. 2016 **Ambient condition:** Temperature 22.7°C **Relative humidity:** 49%

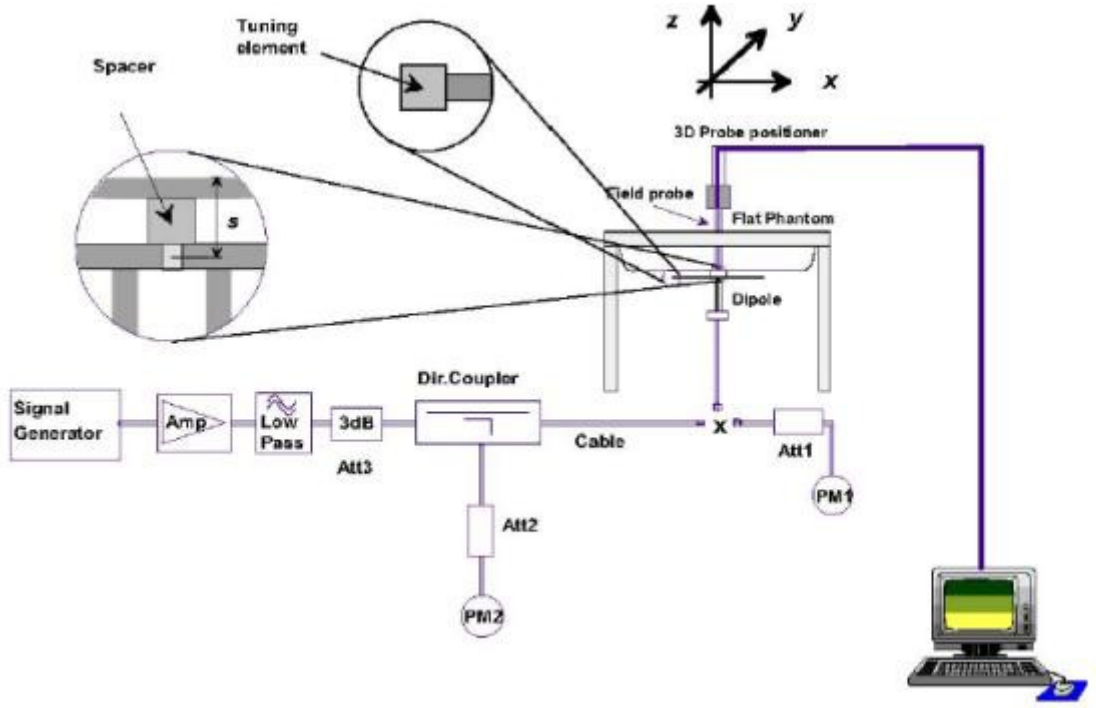
Body Simulating Liquid		Parameters	Target	Measured	Deviation[%]	Limited[%]
Frequency	Temp. [°C]					
835 MHz	22.30	Permitivity:	55.20	54.12	-1.96	± 5
		Conductivity:	0.97	0.95	-2.06	± 5
1900 MHz	22.30	Permitivity:	53.30	53.21	-0.17	± 5
		Conductivity:	1.52	1.50	-1.32	± 5
2450 MHz	22.30	Permitivity:	52.70	53.41	1.35	± 5
		Conductivity:	1.95	1.93	-1.03	± 5

5. SAR System Validation

5.1 Validation System

Each SATIMO system is equipped with one or more system validation kits. These units, together with the predefined measurement procedures within the SATIMO software, enable the user to conduct the system performance check and system validation. System kit includes a dipole, and dipole device holder.

The system check verifies that the system operates within its specifications. It's performed daily or before every SAR measurement. The system check uses normal SAR measurement in the flat section of the phantom with a matched dipole at a specified distance. The system validation setup is shown as below.



5.2 Validation Result

Comparing to the original SAR value provided by SATIMO, the validation data should be within its specification of 10 %.

Ambient condition: Temperature 22.7°C **Relative humidity:** 49%

Freq.(MHz)	Power(mW)	Tested Value (W/Kg)	Normalized SAR (W/kg)	Target(W/Kg)	Tolerance(%)	Date
835 Body	100	0.941	9.41	9.56	-1.57	2016-09-18
1900 Body	100	4.161	41.61	39.7	4.81	2016-09-18
2450 Body	100	5.317	53.17	52.4	1.47	2016-09-18

Note:

(1) We use a CW signal of 20dBm for system check, and then all SAR value are normalized to 1W forward power. The result must be within ±10% of target value.

6. SAR Evaluation Procedures

The procedure for assessing the average SAR value consists of the following steps:
The following steps are used for each test position
- Establish a call with the maximum output power with a base station simulator. The connection between the mobile and the base station simulator is established via air interface
- Measurement of the local E-field value at a fixed location. This value serves as a reference value for calculating a possible power drift.
- Measurement of the SAR distribution with a grid of 8 to 16mm * 8 to16 mm and a constant distance to the inner surface of the phantom. Since the sensors cannot directly measure at the inner phantom surface, the values between the sensors and the inner phantom surface are extrapolated. With these values the area of the maximum SAR is calculated by an interpolation scheme.
- Around this point, a cube of 30 * 30 * 30 mm or 32 * 32 * 32 mm is assessed by measuring 5 or 8 * 5 or 8*4 or 5 mm. With these data, the peak spatial-average SAR value can be calculated.

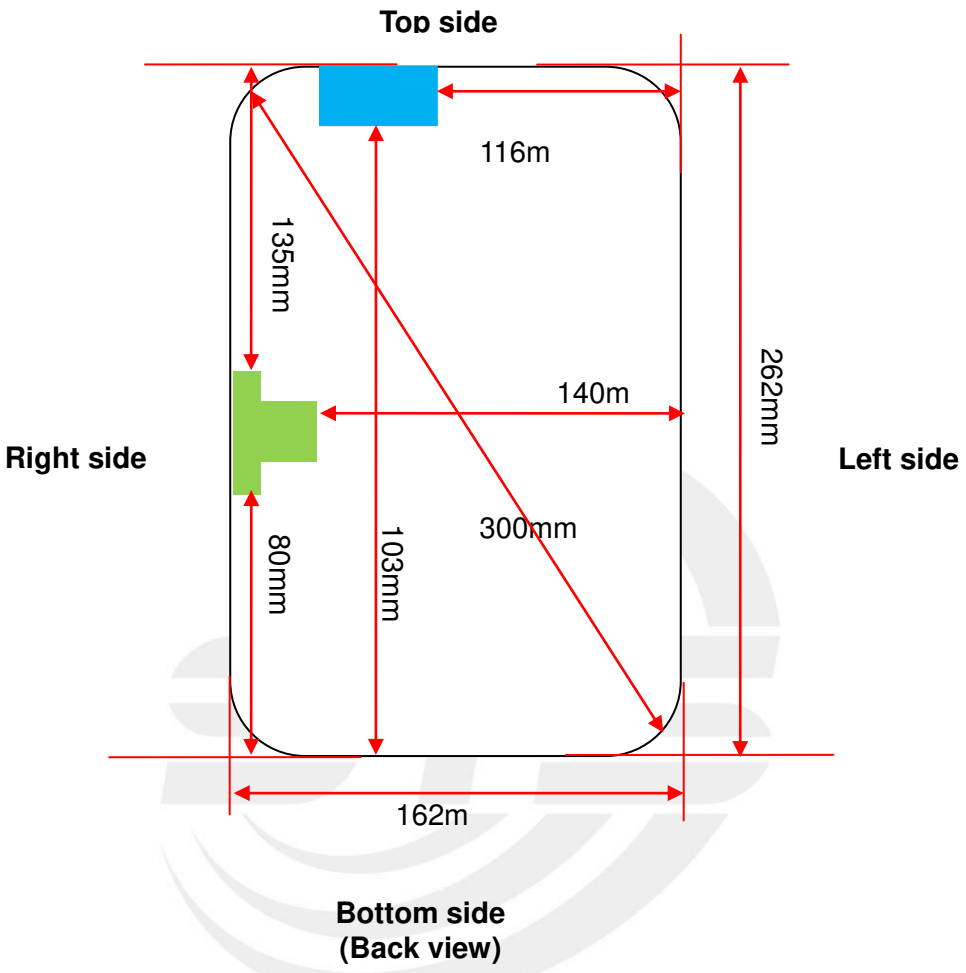
Area Scan& Zoom Scan:

First Area Scan is used to locate the approximate location(s) of the local peak SAR value(s). The measurement grid within an Area Scan is defined by the grid extent, grid step size and grid offset. Next, in order to determine the EM field distribution in a three-dimensional spatial extension, Zoom Scan is required. The Zoom Scan is performed around the highest E-field value to determine the averaged SAR -distribution over 10 g. Area scan and zoom scan resolution setting follows KDB 865664 D01v01r01 quoted below.

When the 1-g SAR of the highest peak is within 2 dB of the SAR limit, additional zoom scans are required for other peaks within 2 dB of the highest peak that have not been included in any zoom scan to ensure there is no increase in SAR.

7. EUT Antenna Location Sketch

It is a Tablet PC, support GSM/WCDMA mode.



WWAN Antenna

WIFI/BT Antenna

7.1 SAR test exclusion consider table

According with FCC KDB 447498 D01, appendix A, <SAR test exclusion thresholds for 100MHz ~ 6GHz and≤50mm＞table, this device SAR test configurations consider as following:

Band	Test position configurations					
	Front	Back	Right edge	Left edge	Top edge	Bottom edge
WWAN	＜5mm	＜5mm	＜5mm	116mm	＜5mm	103mm
	Yes	Yes	Yes	No	Yes	No
WIFI/BT	＜5mm	＜5mm	＜5mm	140mm	135mm	80mm
	Yes	Yes	Yes	No	No	No

Note：

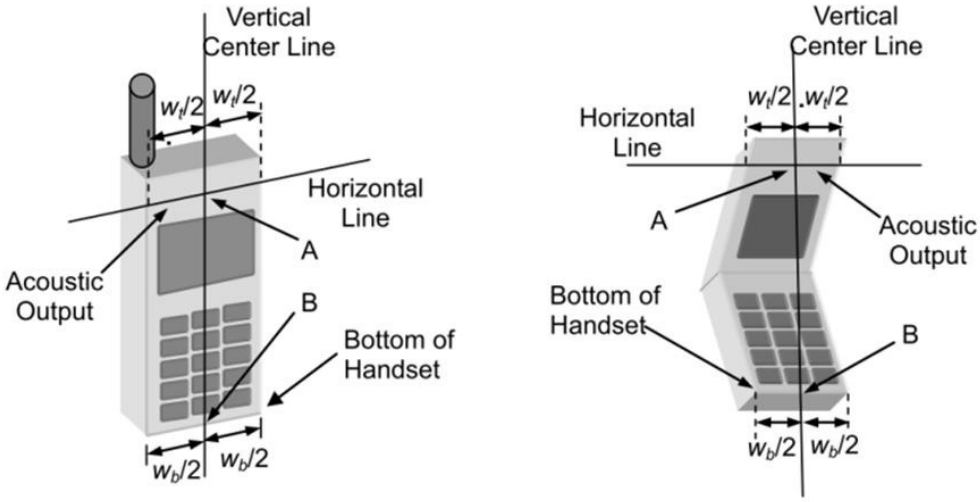
1. maximum power is the source-based time-average power and represents the maximum RF output power among production units.
2. per KDB 447498 D01, for larger devices, the test separation distance of adjacent edge configuration is determined by the closest separation between the antenna and the user.
3. per KDB 447498 D01, standalone SAR test exclusion threshold is applied; if the distance of the antenna to the user is <5mm, 5mm is user to determine SAR exclusion threshold
4. per KDB 447498 D01, the 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distance ≤50mm are determined by:
   [(max.power of channel, including tune-up tolerance, Mw)/(min. test separation distance, mm)]*[√f(GHZ）)≤3.0 for 1-g SAR and≤7.5 for10-g extremity SAR ,f(GHz) is the RF channel transmit frequency in GHz. Power and distance are rounded to the nearest mW and mm before calculation. The result is rounded to one decimal place for comparison For <50mm distance, we just calculate mW of the exclusion threshold value(3.0)to do compare
5. per KDB 447498 D01, at 100 MHz to 6GHz and for test separation distances >50mm, the SAR test exclusion threshold is determined according to the following
   a)[threshold at 50mm in step 1]+(test separation distance -50mm)*(f (MHz)/150)]Mw, at 100 MHz to 1500 MHz
   b) [threshold at 50mm in step1]+(test separation distance -50mm) *10]mW at＞ 1500MHz and≤6GHz
6. Per KDB 447498 D02, RMC 12.2kbps setting is used to evaluate SAR. If HSDPA/ HSUPA/DC-HSDPA output power is<0.25db higher than RMC 12.2Kbps,or reported SAR with RMC 12.2kbps setting is ≤1.2W/Kg, HSDPA/HSUPA/DC-HSDPA SAR evaluation can be excluded.
7. Per KDB 248227 D01, choose the highest output power channel to test SAR and determine further SAR exclusion 8.for each frequency band ,testing at higher data rates and higher order modulations is not required when the maximum average output power for each of each of these configurations is less than 1/4db higher than those measured at the lower data rate than 11b mode ,thus the SAR can be excluded.

8. EUT Test Position

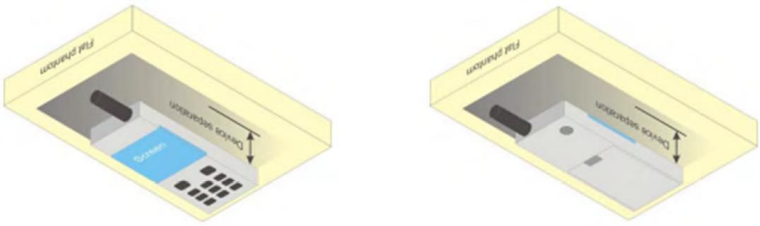
This EUT was tested in Right Cheek, Right Titled, Left Cheek, Left Titled, Front Face and Rear Face.

8.1 Define Two Imaginary Lines On The Handset

(1)The vertical centerline passes through two points on the front side of the handset the midpoint of the width wt of the handset at the level of the acoustic output, and the midpoint of the width wb of the handset.
(2)The horizontal line is perpendicular to the vertical centerline and passes through the center of the acoustic output. The horizontal line is also tangential to the face of the handset at point A.
(3)The two lines intersect at point A. Note that for many handsets, point A coincides with the center of the acoustic output; however, the acoustic output may be located elsewhere on the horizontal line. Also note that the vertical centerline is not necessarily to the front face of the handset, especially for clamshell handsets, handsets with flip covers, and other irregularly shaped handsets.



Body-worn Position Conditions:
Body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in KDB Publication 447498 D01 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. When the same wireless transmission configuration is used for testing body-worn accessory and hotspot mode SAR, respectively, in voice and data mode, SAR results for the most conservative *test separation distance* configuration may be used to support both SAR conditions. When the *reported* SAR for a body-worn accessory, measured without a headset connected to the handset, is > 1.2 W/kg, the highest *reported* SAR configuration for that wireless mode and frequency band should be repeated for the body-worn accessory with a headset attached to the handset.

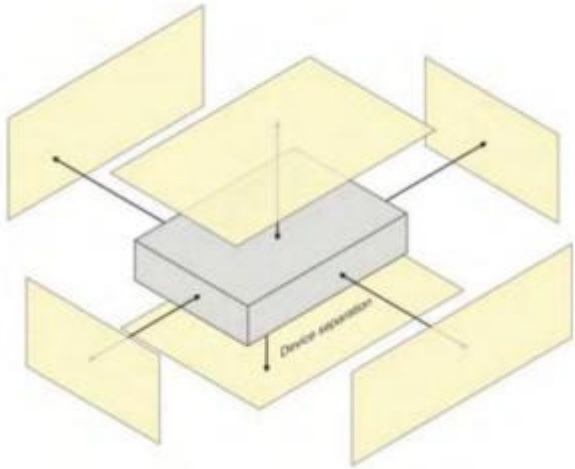


8.2 Hotspot mode exposure position condition

For handsets that support hotspot mode operations, with wireless router capabilities and various web browsing function, the relevant hand and body exposure condition are tested according to the hotspot SAR procedures in KDB 941225. A test separation distance of 10 mm is required between the phantom and all surface and edges with a transmitting antenna located within 25 mm form that surface or edge.

When form factor of a handset is smaller than 9cm x 5cm, a test separation distance of 5mm (instead of 10mm)is required for testing hotspot mode. When the separate distance required for

body-worn accessory testing is larger than or equal to that tested for hotspot mode, in the same wireless mode and for the same surface of the phone, the hotspot mode SAR data may be used to support body-worn accessory SAR compliance for that particular configuration(surface).



9. Uncertainty

9.1 Measurement Uncertainty

The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in IEEE 1528: 2013.This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

NO	Source	Tol(%)	Prob. Dist.	Div. k	ci (1g)	ci (10g)	1gUi	10gUi	Veff
Measurement System									
1	Probe calibration	5.8	N	1	1	1	5.8	5.8	∞
2	Axial isotropy	3.5	R	√3	$(1-cp)^{1/2}$	$(1-cp)^{1/2}$	1.43	1.43	∞
3	Hemispherical isotropy	5.9	R	√3	$\sqrt{C_p}$	$\sqrt{C_p}$	2.41	2.41	∞
4	Boundary effect	1.0	R	√3	1	1	0.58	0.58	∞
5	Linearity	4.7	R	√3	1	1	2.71	2.71	∞
6	System Detection limits	1.0	R	√3	1	1	0.58	0.58	∞
7	Readout electronics	0.5	N	1	1	1	0.50	0.50	∞
8	Response time	0	R	√3	1	1	0	0	∞
9	Integration time	1.4	R	√3	1	1	0.81	0.81	∞
10	Ambient noise	3.0	R	√3	1	1	1.73	1.73	∞
11	Ambient reflections	3.0	R	√3	1	1	1.73	1.73	∞
12	Probe positioner mech. restrictions	1.4	R	√3	1	1	0.81	0.81	∞
13	Probe positioning with respect to phantom shell	1.4	R	√3	1	1	0.81	0.81	∞
14	Max.SAR evaluation	1.0	R	√3	1	1	0.6	0.6	∞
Test sample related									
15	Device positioning	2.6	N	1	1	1	2.6	2.6	11

16	Device holder	3	N	1	1	1	3.0	3.0	7
17	Drift of output power	5.0	R	√3	1	1	2.89	2.89	∞
Phantom and set-up									
18	Phantom uncertainty	4.0	R	√3	1	1	2.31	2.31	∞
19	Liquid conductivity (target)	2.5	N	1	0.78	0.71	1.95	1.78	5
20	Liquid conductivity (meas)	4	N	1	0.23	0.26	0.92	1.04	5
21	Liquid Permittivity (target)	2.5	N	1	0.78	0.71	1.95	1.78	∞
22	Liquid Permittivity (meas)	5.0	N	1	0.23	0.26	1.15	1.30	∞
Combined standard			RSS	$U_C = \sqrt{\sum_{i=1}^{n} C_i^2 U_i^2}$			10.63%	10.54%	
Expanded uncertainty (P=95%)		$U = k\,U_C$,k=2					21.26%	21.08%	

9.2 System validation Uncertainty

NO	Source	Tol(%)	Prob. Dist.	Div. k	ci (1g)	ci (10g)	1gUi	10gUi	Veff
Measurement System									
1	Probe calibration	5.8	N	1	1	1	5.8	5.8	∞
2	Axial isotropy	3.5	R	√3	$(1-cp)^{1/2}$	$(1-cp)^{1/2}$	1.43	1.43	∞
3	Hemispherical isotropy	5.9	R	√3	$\sqrt{C_p}$	$\sqrt{C_p}$	2.41	2.41	∞
4	Boundary effect	1.0	R	√3	1	1	0.58	0.58	∞
5	Linearity	4.7	R	√3	1	1	2.71	2.71	∞
6	System Detection limits	1.0	R	√3	1	1	0.58	0.58	∞
7	Modulation response	0	N	1	1	1	0	0	∞
8	Readout electronics	0.5	N	1	1	1	0.50	0.50	∞
9	Response time	0	R	√3	1	1	0	0	∞
10	Integration time	1.4	R	√3	1	1	0.81	0.81	∞
11	Ambient noise	3.0	R	√3	1	1	1.73	1.73	∞
12	Ambient reflections	3.0	R	√3	1	1	1.73	1.73	∞
13	Probe positioner mech. restrictions	1.4	R	√3	1	1	0.81	0.81	∞
14	Probe positioning with respect to phantom shell	1.4	R	√3	1	1	0.81	0.81	∞
15	Max.SAR evaluation	1.0	R	√3	1	1	0.6	0.6	∞
Dipole									
16	Deviation of experimental source from	4	N	1	1	1	4.00	4.00	∞

17	Input power and SAR drit measurement	5	R	√3	1	1	2.89	2.89	∞
18	Dipole Axis to liquid Distance	2	R	√3	1	1			∞
Phantom and set-up									
19	Phantom uncertainty	4.0	R	√3	1	1	2.31	2.31	∞
20	Uncertainty in SAR correction for deviation(in	2.0	N	1	1	0.84	2	1.68	∞
21	Liquid conductivity (target)	2	N	1	1	0.84	2.00	1.68	∞
22	Liquid conductivity (temperature uncertainty)	2.5	N	1	0.78	0.71	1.95	1.78	5
23	Liquid conductivity (meas)	4	N	1	0.23	0.26	0.92	1.04	5
24	Liquid Permittivity (target)	2.5	N	1	0.78	0.71	1.95	1.78	∞
25	Liquid Permittivity (temperature uncertainty)	2.5	N	1	0.78	0.71	1.95	1.78	5
26	Liquid Permittivity (meas)	5.0	N	1	0.23	0.26	1.15	1.30	∞
Combined standard			RSS	$U_C = \sqrt{\sum_{i=1}^{n} C_i^2 U_i^2}$			10.15%	10.05%	
Expanded uncertainty (P=95%)		$U = k\,U_C$,k=2					20.29%	20.10%	

10. Conducted Power Measurement

10.1 Test Result

Burst Average Power (dBm)						
Band	GSM 850			PCS 1900		
Channel	128	190	251	512	661	810
Frequency (MHz)	824.2	836.6	848.8	1850.2	1880.0	1909.8
GSM(GMSK, 1-Slot)	31.87	31.83	31.75	28.77	28.58	28.62
GPRS (GMSK, 1-Slot)	32.65	32.61	32.52	29.22	29.07	29.16
GPRS (GMSK, 2-Slot)	31.70	31.62	31.53	28.41	28.27	28.33
GPRS (GMSK, 3-Slot)	30.12	30.02	29.86	26.73	26.57	26.64
GPRS (GMSK, 4-Slot)	28.87	28.79	28.72	25.29	25.11	25.15
EGPRS(8PSK, 1-Slot)	27.26	27.20	27.13	24.06	23.92	24.03
EGPRS(8PSK, 2-Slot)	26.52	26.45	26.36	23.35	23.20	23.25
EGPRS(8PSK, 3-Slot)	25.23	25.17	25.08	22.08	21.92	22.01
EGPRS(8PSK, 4-Slot)	23.70	23.62	23.57	21.76	21.66	21.67
Remark: GPRS, CS4 coding scheme. EGPRS, MCS9 coding scheme. Multi-Slot Class 8 , Support Max 4 downlink, 1 uplink , 5 working link Multi-Slot Class 10 , Support Max 4 downlink, 2 uplink , 5 working link Multi-Slot Class 12 , Support Max 4 downlink, 4 uplink , 5 working link						

Fram- Average Power(dBm)						
Band	GSM 850			PCS 1900		
Channel	128	190	251	512	661	810
Frequency (MHz)	824.2	836.6	848.8	1850.2	1880.0	1909.8
GSM(GMSK, 1-Slot)	22.84	22.80	22.72	19.74	19.55	19.59
GPRS (GMSK, 1-Slot)	23.62	23.58	23.49	20.19	20.04	20.13
GPRS (GMSK, 2-Slot)	25.68	25.60	25.51	22.39	22.25	22.31
GPRS (GMSK, 3-Slot)	25.86	25.76	25.60	22.47	22.31	22.38
GPRS (GMSK, 4-Slot)	25.86	25.78	25.71	22.28	22.10	22.14
EGPRS(8PSK, 1-Slot)	18.23	18.17	18.10	15.03	14.89	15.00
EGPRS(8PSK, 2-Slot)	20.50	20.43	20.34	17.33	17.18	17.23
EGPRS(8PSK, 3-Slot)	20.97	20.91	20.82	17.82	17.66	17.75
EGPRS(8PSK, 4-Slot)	20.69	20.61	20.56	18.75	18.65	18.66
Remark : 1. SAR testing was performed on the maximum frame-averaged power mode. 2. The frame-averaged power is linearly proportion to the slot number configured and it is linearly scaled the maximum burst-averaged power based on time slots. The calculated method is shown as below: Frame-averaged power = Burst averaged power (1 Tx Slot) – 9.03 dB Frame-averaged power = Burst averaged power (2 Tx Slots) – 6.02 dB Frame-averaged power = Burst averaged power (3 Tx Slots) - 4.26 dB Frame-averaged power = Burst averaged power (4 Tx Slots) – 3.01 dB						

WCDMA

Band	WCDMA Band V			WCDMA Band II		
Channel	4132	4183	4233	9262	9400	9538
Frequency (MHz)	826.4	836.6	846.6	1852.4	1880.0	1907.6
AMR 12.2Kbps	21.01	21.30	21.11	20.34	20.33	20.34
RMC 12.2Kbps	21.44	21.61	21.56	20.99	20.61	20.78
HSDPA Subtest-1	21.36	21.52	21.49	20.85	20.56	20.67
HSDPA Subtest-2	21.22	21.30	21.28	20.55	20.24	20.35
HSDPA Subtest-3	21.12	21.19	21.16	20.38	20.10	20.23
HSDPA Subtest-4	21.23	21.35	21.27	20.64	20.37	20.46
HSUPA Subtest-1	20.76	20.83	20.80	20.63	20.41	20.50
HSUPA Subtest-2	20.63	20.75	20.65	20.71	20.56	20.59
HSUPA Subtest-3	20.43	20.58	20.50	20.43	20.19	20.28
HSUPA Subtest-4	20.29	20.41	20.39	20.52	20.27	20.38
HSUPA Subtest-5	20.57	20.70	20.63	20.23	20.02	20.10

According to 3GPP 25.101 sub-clause 6.2.2 , the maximum output power is allowed to be reduced by following the table.

Table 6.1A: UE maximum output power with HS-DPCCH and E-DCH

UE Transmit Channel Configuration	CM(db)	MPR(db)
For all combinations of ,DPDCH,DPCCH HS-DPDCH,E-DPDCH and E-DPCCH	0≤ CM≤3.5	MAX(CM-1,0)
Note: CM=1 for βc/βd=12/15, βhs/ βc=24/15.For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.		

The device supports MPR to solve linearity issues (ACLR or SEM) due to the higher peak-to average ratios (PAR) of the HSUPA signal. This prevents saturating the full range of the TX DAC inside of device and provides a reduced power output to the RF transceiver chip according to the Cubic Metric (a function of the combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH).

When E-DPDCH channels are present the beta gains on those channels are reduced firsts to try to get the power under the allowed limit. If the beta gains are lowered as far as possible, then a hard limiting is applied at the maximum allowed level.

The SW currently recalculates the cubic metric every time the beta gains on the E-DPDCH are reduced. The cubic metric will likely get lower each time this is done .However, there is no reported reduction of maximum output power in the HSUPA mode since the device also provides a compensation for the power back-off by increasing the gain of TX_AGC in the transceiver (PA) device.

The end effect is that the DUT output power is identical to the case where there is no MPR in the device.

WIFI

Mode	Channel Number	Frequency (MHz)	Average Power (dBm)
802.11b	1	2412	9.61
	6	2437	9.83
	11	2462	9.98
802.11g	1	2412	13.06
	6	2437	12.62
	11	2462	12.75
802.11n(HT 20)	1	2412	13.03
	6	2437	12.59
	11	2462	12.75

Bluetooth

Mode	Channel Number	Frequency (MHz)	Average Power (dBm)
GFSK(1Mbps)	0	2402	-7.50
	39	2441	-6.66
	78	2480	-6.18
π/4-DQPSK(2Mbps)	0	2402	-8.33
	39	2441	-7.54
	78	2480	-7.02
8DPSK(3Mbps)	0	2402	-8.49
	39	2441	-7.60
	78	2480	-7.17

BT 4.0

Mode	Channel Number	Frequency (MHz)	Average Power (dBm)
GFSK(1Mbps)	0	2402	-10.32
	19	2440	-9.87
	39	2480	-9.72

10.2 Tune-up Power

Mode	GSM850(AVG)	GSM1900(AVG)
GSM/PCS	31±1dBm	28±1dBm
GPRS (1 Slot)	32±1dBm	29±1dBm
GPRS (2 Slot)	31±1dBm	28±1dBm
GPRS (3 Slot)	30±1dBm	25.8±1dBm
GPRS (4 Slot)	28±1dBm	25±1dBm
EDGE (1 Slot)	27±1dBm	24±1dBm
EDGE (2 Slot)	26±1dBm	23±1dBm
EDGE (3 Slot)	25±1dBm	22±1dBm
EDGE (4 Slot)	23±1dBm	21±1dBm

Mode	WCDMA Band V(AVG)	WCDMA Band II(AVG)
AMR	21±1dBm	20±1dBm
RMC	20.7±1dBm	20±1dBm
HSDPA Subtest-1	21±1dBm	20±1dBm
HSDPA Subtest-2	21±1dBm	20±1dBm
HSDPA Subtest-3	21±1dBm	20±1dBm
HSDPA Subtest-4	21±1dBm	20±1dBm
HSUPA Subtest-1	20±1dBm	20±1dBm
HSUPA Subtest-2	20±1dBm	20±1dBm
HSUPA Subtest-3	20±1dBm	20±1dBm
HSUPA Subtest-4	20±1dBm	20±1dBm
HSUPA Subtest-5	20±1dBm	20±1dBm

Mode	WIFI(AVG)
IEEE 802.11b	9±1dBm
IEEE 802.11g	12.5±1dBm
IEEE 802.11n(HT 20)	13±1dBm

Mode	BT(AVG)
GFSK	-7±1dBm
π/4-DQPSK	-8±1dBm
8DPSK	-8±1dBm

Mode	BT 4.0(AVG)
GFSK	-10±1dBm

10.3 SAR Test Exclusions Applied

Per FCC KDB 447498D01, the 1-g SAR and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:
[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)]·[√f(GHZ)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where:

- f(GHZ) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison

When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

$$\frac{Max\ Power\ of\ Channel\ (mW)}{Test\ Separation\ Dist\ (mm)} * \sqrt{Frequency(GHz)} \leq 3.0$$

Based on the maximum conducted power of **Bluetooth Body** (rounded to the nearest mW) and the antenna to user separation distance,

Bluetooth Body SAR was not required; [(0.251/10)* √2.480] = **0.04** < 3.0.

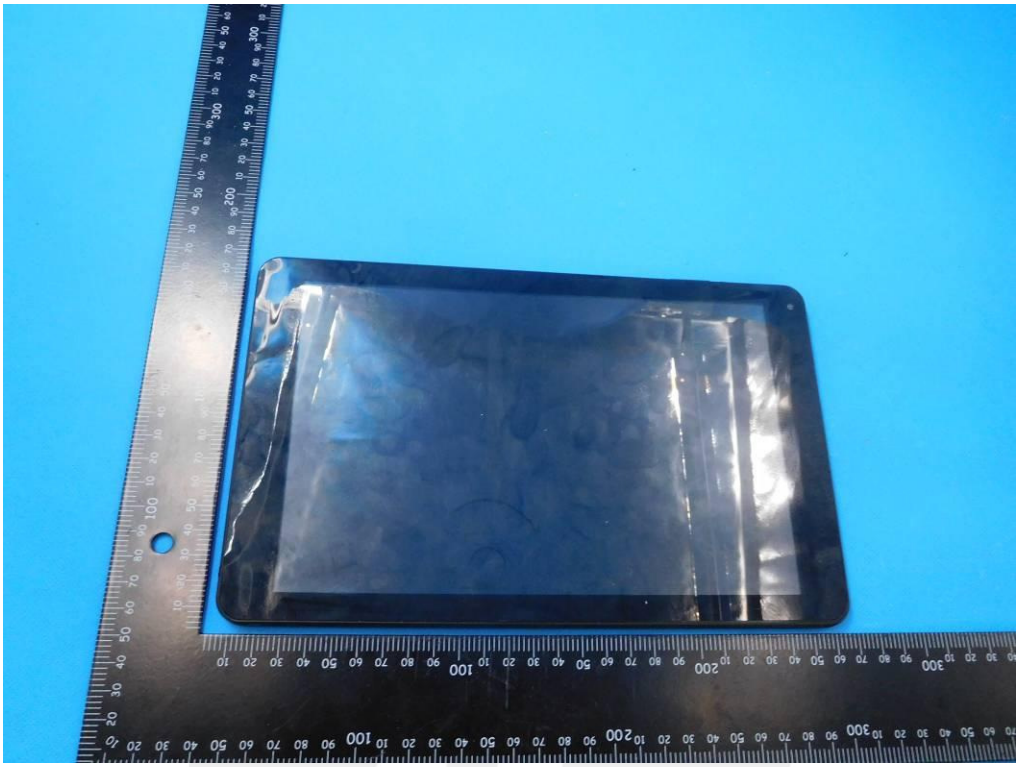
Based on the maximum conducted power of **2.4 GHz WIFI Body** (rounded to the nearest mW) and the antenna to user separation distance,

2.4 GHz WIFI Body SAR was required; [(22.387/10)* √2.412] = **3.48** > 3.0.

11. EUT And Test Setup Photo

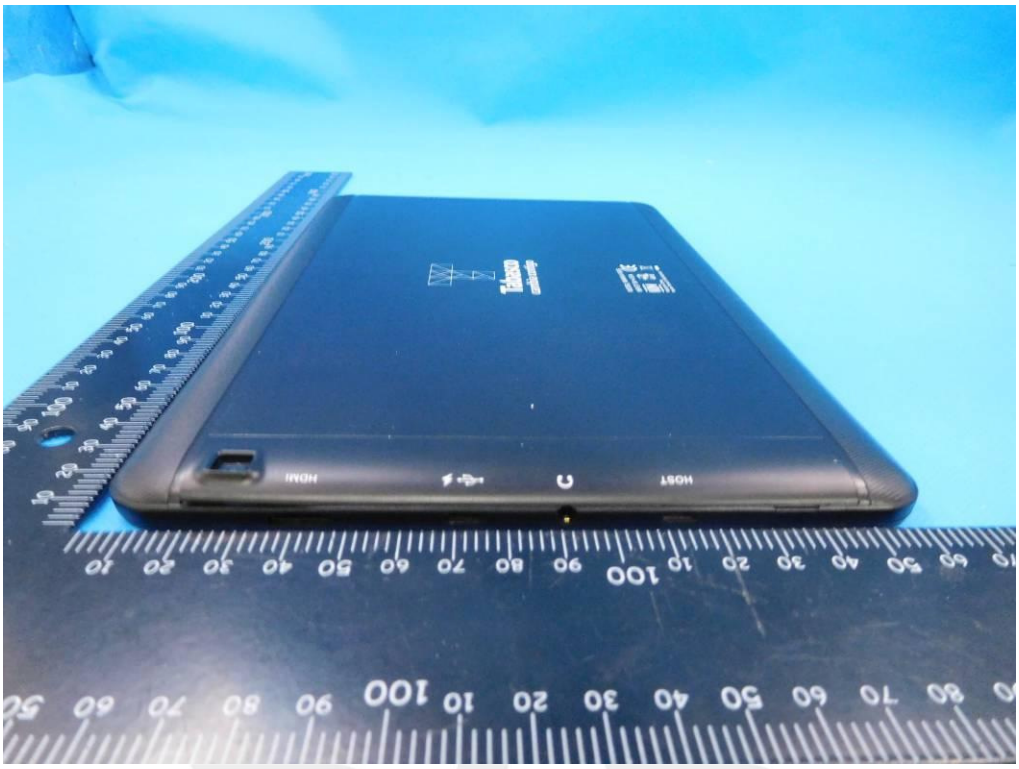
11.1 EUT Photo

Front side

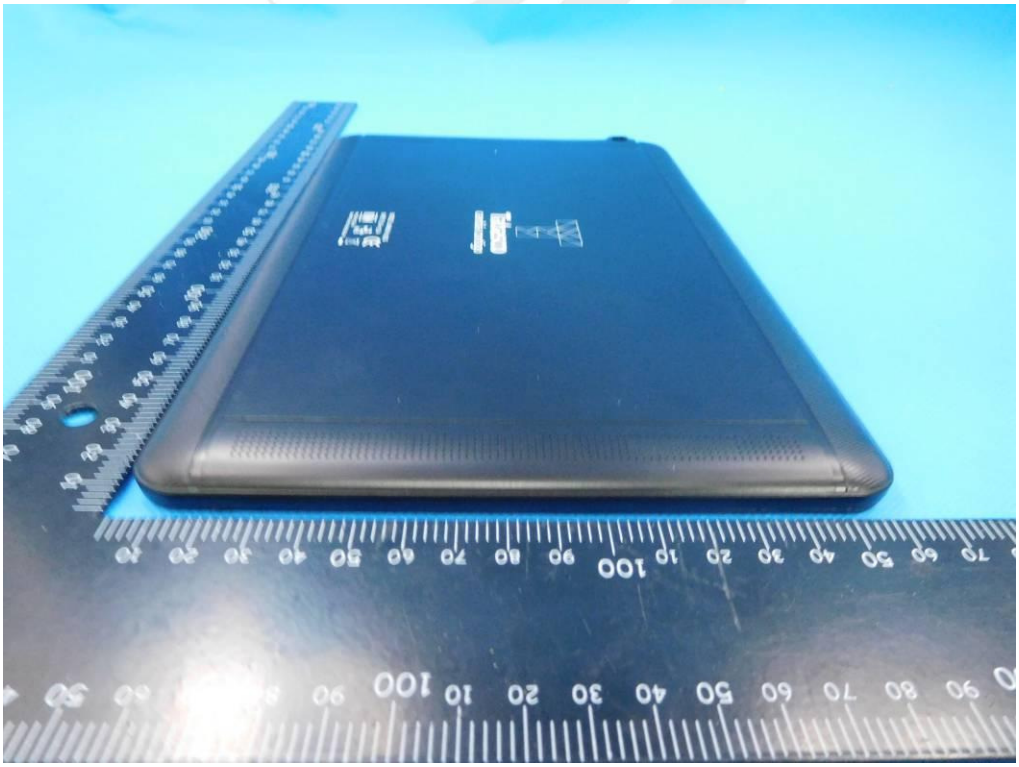


Back side

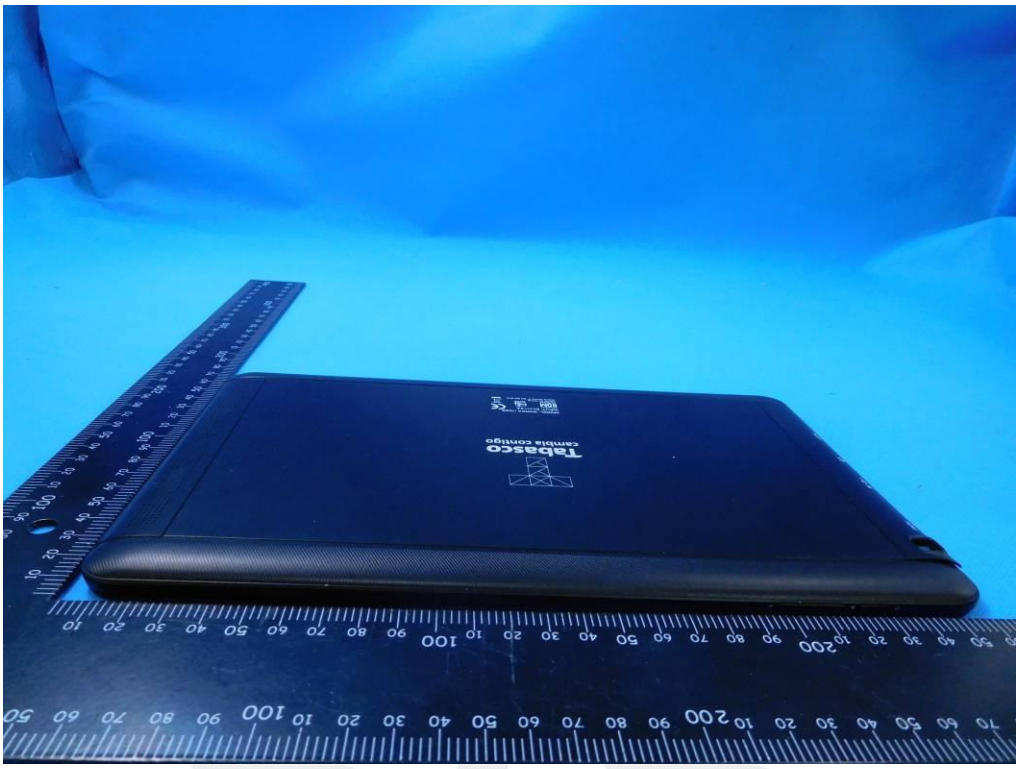
Top side



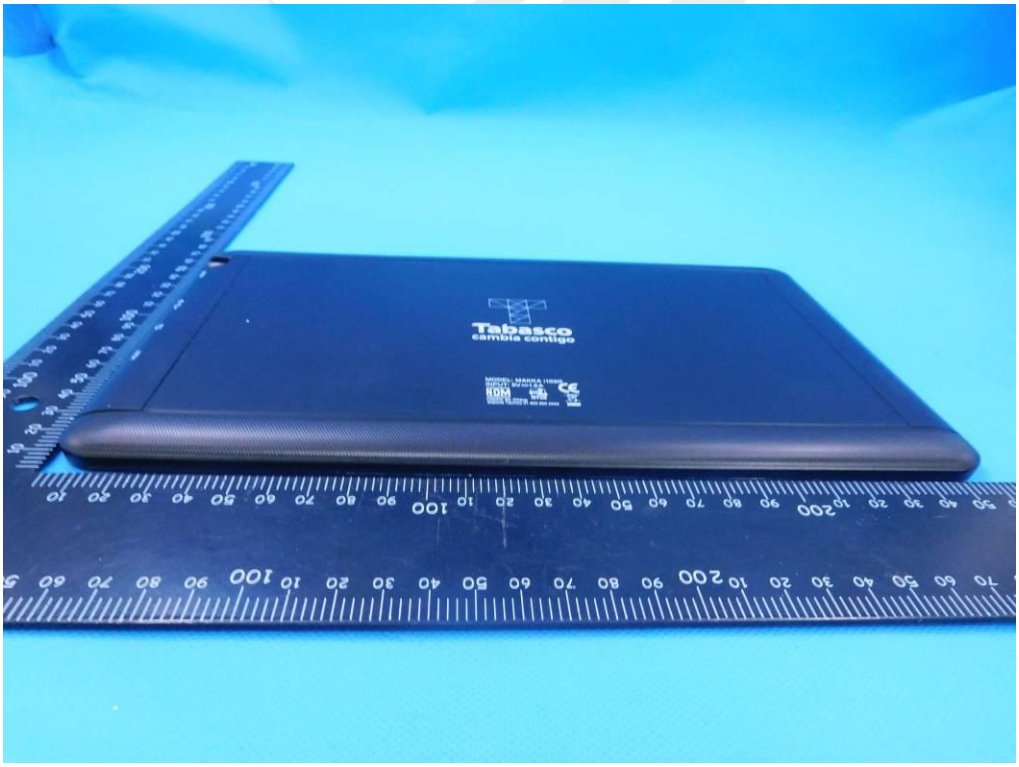
Bottom side



Left side



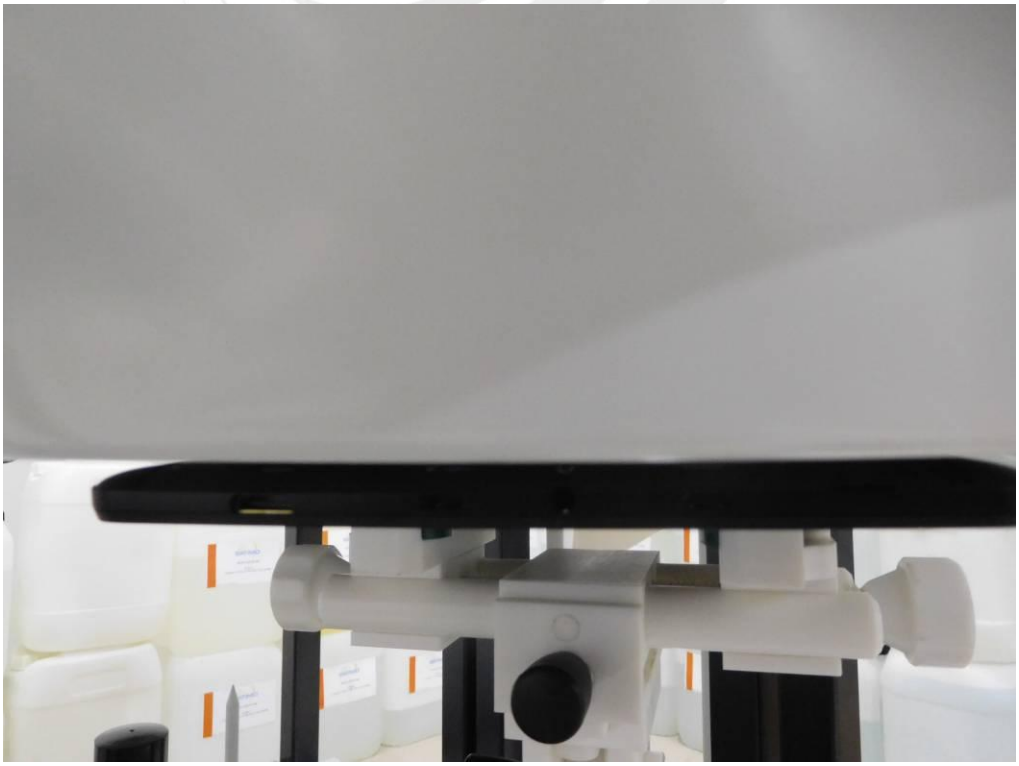
Right side



11.2 Setup Photo

Body Front side(separation distance is 0mm)

Body Back side(separation distance is 0mm)



Body Back side with shell(separation distance is 0mm)

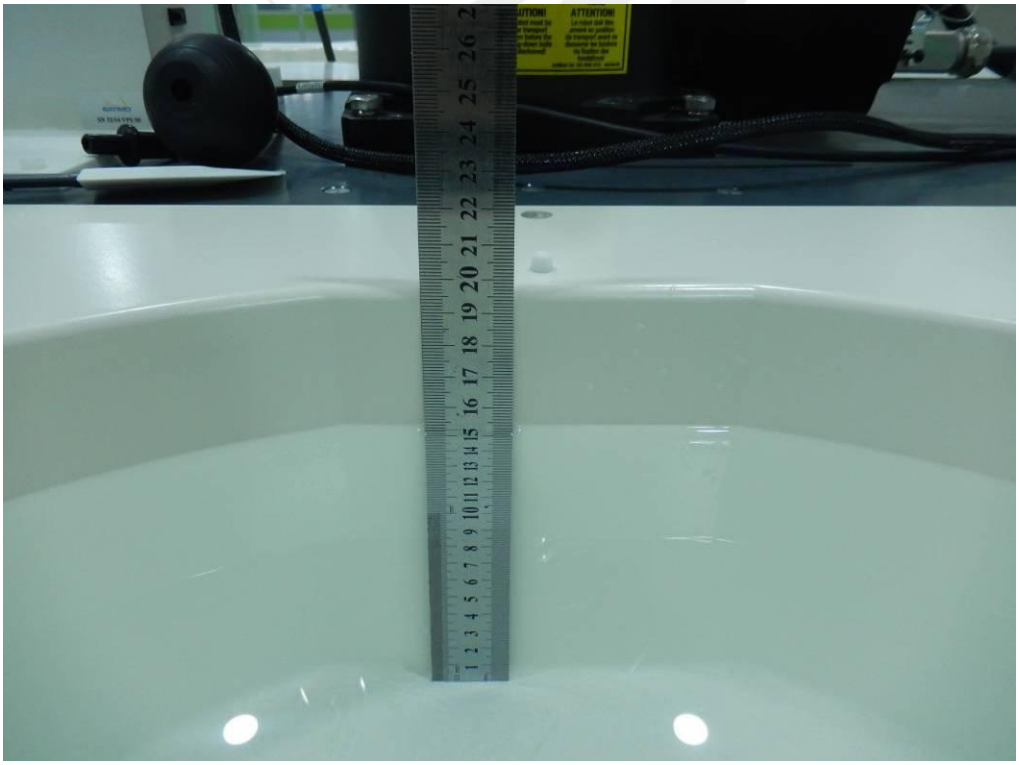
Body right side(separation distance is 0mm)

Body right side with shell (separation distance is 0mm)

Body top side (separation distance is 0mm)

Body top side with shell (separation distance is 0mm)

Liquid depth (15 cm)



12. SAR Result Summary

12.1 Body-worn and Hotspot SAR

Body without protection shell

Band	Mode	Test Position	Ch.	Result 1g (W/Kg)	Power Drift(%)	Max.Turn-up Power(dBm)	Meas.Output Power(dBm)	Scaled SAR (W/Kg)	Meas. No.
GSM 850	GPRS Data-4 Slot	Front side	128	0.684	1.94	29	28.87	0.705	/
		Back side	128	1.102	1.47	29	28.87	**1.135**	1
		Back side	190	1.024	1.55	29	28.87	1.055	/
		Back side	251	0.987	3.61	29	28.87	1.017	/
		Right side	128	0.365	2.20	29	28.87	0.376	/
		Top side	128	0.689	1.05	29	28.87	0.710	/
GSM1900	GPRS Data-3 Slot	Front side	512	0.723	0.66	26.8	26.73	0.735	/
		Back side	512	1.115	-1.41	26.8	26.73	**1.133**	2
		Back side	661	1.057	3.38	26.8	26.73	1.074	/
		Back side	810	1.102	2.15	26.8	26.73	1.120	/
		Right side	512	0.652	2.45	26.8	26.73	0.663	/
		Top side	512	0.421	1.00	26.8	26.73	0.428	/
WCDMA Band II	RMC	Front side	9262	0.768	-0.17	21.70	21.61	0.784	/
		Back side	9262	1.124	-1.11	21.70	21.61	**1.148**	3
		Back side	9400	1.045	2.65	21.70	21.61	1.067	/
		Back side	9538	1.002	1.68	21.70	21.61	1.023	/
		Right side	9262	0.523	-3.96	21.70	21.61	0.534	/
		Top side	9262	0.451	0.61	21.70	21.61	0.460	/
WCDMA Band V	RMC	Front side	4183	0.546	0.85	21	20.99	0.547	/
		Back side	4183	0.854	1.53	21	20.99	0.856	/
		Back side	4183	**0.978**	-0.69	21	20.99	**0.980**	4
		Back side	4183	0.812	-0.33	21	20.99	0.814	/
		Right side	4183	0.366	3.13	21	20.99	0.367	/
		Top side	4183	0.398	2.17	21	20.99	0.399	/

Band	Mode	Test Position	Ch.	Result 1g (W/Kg)	Power Drift(%)	Max.Turn-up Power(dBm)	Meas.Output Power(dBm)	Duty cycle(%)	Scaled SAR (W/Kg)	Meas. No.
WIFI	802.11b	Front side	11	0.124	1.38	10	9.98	100	0.125	/
		Back side	11	0.194	-2.64	10	9.98	100	**0.195**	5
		Right side	11	0.102	0.79	10	9.98	100	0.102	/

Note:

1. The test separation of all above table is 0mm.
2. Per KDB 248227- When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg. (The highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power was **0.396** W/Kg for Body)
3. When the user enables the personal Wireless router functions for the handsets, actual operations include simultaneous transmission of both the Wi-Fi transmitting frequency and thus cannot be evaluated for SAR under actual use conditions. The “Portable Hotspot” feature on the handset was NOT activated, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal.

Body with protection shell

Band	Mode	Test Position	Ch.	Result 1g (W/Kg)	Power Drift(%)	Max.Turn-up Power(dBm)	Meas.Output Power(dBm)	Scaled SAR (W/Kg)	Meas. No.
GSM 850	GPRS Data-4 Slot	Body Back	128	0.983	-0.11	29	28.87	1.013	/
		Body Back	128	0.869	0.93	29	28.87	0.895	/
		Body Back	190	0.810	0.297	29	28.87	0.835	/
		Right side	128	0.261	-1.96	29	28.87	0.269	/
		Top side	128	0.548	-1.15	29	28.87	0.565	/
GSM 1900	GPRS Data-3 Slot	Body Back	512	1.026	2.48	26.8	26.73	1.043	/
		Body Back	661	0.987	3.86	26.8	26.73	1.003	/
		Body Back	810	0.892	3.12	26.8	26.73	0.906	/
		Right side	512	0.559	2.28	26.8	26.73	0.568	/
		Top side	512	0.326	-0.26	26.8	26.73	0.331	/
WCDMA Band II	RMC	Body Back	9262	1.034	-4.00	21.70	21.61	1.056	/
		Body Back	9400	0.965	2.68	21.70	21.61	0.985	/
		Body Back	9538	0.892	-0.76	21.70	21.61	0.911	/
		Right side	9262	0.419	2.36	21.70	21.61	0.428	/
		Top side	9262	0.338	-0.44	21.70	21.61	0.345	/
WCDMA V	RMC	Body Back	4183	0.784	0.00	21	20.99	0.786	/
		Right side	4183	0.258	-2.48	21	20.99	0.259	/
		Top side	4183	0.269	-0.92	21	20.99	0.270	/
WIFI	802.1b	Body Back	11	0.102	-2.90	10	9.98	0.102	/
		Right side	11	0.065	0.68	10	9.98	0.065	/

Note:

1. The test separation of all above table is 0mm.
2. Per KDB 248227- When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg. (The highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power was **0.207** W/Kg for Body)
3. When the user enables the personal Wireless router functions for the handsets, actual operations include simultaneous transmission of both the Wi-Fi transmitting frequency and thus cannot be evaluated for SAR under actual use conditions. The “Portable Hotspot” feature on the handset was NOT activated, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal.

Repeated SAR

Body without protection shell

Band	Test Position	Ch.	Result 1g (W/Kg)	Power Drift(%)	Max.Turn-up Power(dBm)	Meas.Output Power(dBm)	Scaled SAR (W/Kg)	Meas. No.
GSM 850	Back Side	128	1.134	3.56	29	28.87	1.168	/
GSM 1900	Back Side	512	1.110	-2.51	26.80	26.73	1.128	/
WCDMA Band II	Back Side	9262	1.101	2.89	21.70	21.61	1.124	/
WCDMA Band V	Back Side	4183	1.002	-1.65	21	20.99	1.004	/

Body with protection shell

Band	Test Position	Ch.	Result 1g (W/Kg)	Power Drift(%)	Max.Turn-up Power(dBm)	Meas.Output Power(dBm)	Scaled SAR (W/Kg)	Meas. No.
GSM 850	Back Side	128	0.983	0.51	29	28.87	1.013	/
GSM 1900	Back Side	512	1.026	-0.62	26.80	26.73	1.043	/
WCDMA Band II	Back Side	9262	1.034	-2.70	21.70	21.61	1.056	/

12.2 repeated SAR measurement

Body without protection shell

Band	Test Position	Ch.	Original Measured SAR 1g(mW/g)	1 st Repeated SAR 1g	Ratio	Original Measured SAR 1g(mW/g)	2nd Repeated SAR 1g	Ratio
GSM 850	Back Side	128	1.102	1.134	1.03	-	-	-
GSM 1900	Back Side	512	1.115	1.110	1.00	-	-	-
WCDMA Band II	Back Side	9262	1.124	1.101	1.02	-	-	-
WCDMA Band V	Back Side	4183	0.978	1.002	1.02			

Body with protection shell

Band	Test Position	Ch.	Original Measured SAR 1g(mW/g)	1 st Repeated SAR 1g	Ratio	Original Measured SAR 1g(mW/g)	2nd Repeated SAR 1g	Ratio
GSM 850	Back Side	128	0.983	0.985	1.00	-	-	-
GSM 1900	Back Side	512	1.026	1.005	1.02	-	-	-
WCDMA Band II	Back Side	9262	1.034	1.019	1.01	-	-	-

Note:

1. Per KDB 865664 D01V01,for each frequency band ,repeated SAR measurement is required only when the measured SAR is≥0.8W/Kg.
2. Per KDB 865664 D01V01,if the ratio of largest to smallest SAR for the original and first repeated measurement is≤1.2and the measured SAR<1.45W/Kg, only one repeated measurement is required.
3. Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is>1.20 or when the original or repeated measurement is ≥ 1.45W/Kg
4. The ratio is the difference in percentage between original and repeated measured SAR.

Simultaneous Multi-band Transmission Evaluation:

Application Simultaneous Transmission information:

Position	Simultaneous state
Body without protection shell	1. GSM + WIFI
	2. GSM + Bluetooth
	3. WCDMA + WIFI
	4. WCDMA + Bluetooth
Body with protection shell	1. GSM + WIFI
	2. WCDMA + WIFI
	3. GSM + BT
	4. WCDMA + BT

NOTE:

1. Bluetooth and WIFI can't simultaneous transmission at the same time.
2. For simultaneous transmission at head and body exposure position, 2 transmitters simultaneous transmission was the worst state.
3. Based upon KDB 447498 D01 v05, BT SAR is excluded as below table.
4. If the test separation distance is <5mm, 5mm is used for excluded SAR calculation.
5. For minimum test separation distance≦50mm,Bluetooth standalone SAR is excluded according to [(max. power of channel, including tune-up tolerance, Mw)/ (min. test separation distance, mm) ·[√f (GHz) /x] ≦3.0 for 1-g SAR and ≦7.5 for 10-g extremity SAR
6. The reported SAR summation is calculated based on the same configuration and test position.
7. KDB 447498 / 4.3.2 (2) when standalone SAR test exclusion applies to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to following to determine simultaneous transmission SAR test exclusion:
   b) (max. power of channel, including tune-up tolerance, Mw)/(min. test separation distance, mm)]·[√f (GHz) /x] W/kg for test separation distances≤ 50 mm;
   Where x = 7.5 for 1-g SAR, and x = 18.75 for 10-g SAR.
   b) 0.4W/Kg for 1-g SAR and 1.0W/Kg for 10-g SAR, when the separation distance is >50mm.

Estimated SAR		Maximum Power		Antenna to user(mm)	Frequency(GHz)	Stand alone SAR(1g) [W/kg]
		dBm	mW			
BT	Body	-6	0.251	10	2.480	0.005

1/F., Building B, Zhuoke Science Park, No.190,Chongqing Road, Fuyong Street, Bao'an District, Shenzhen, Guangdong,China
Tel: 0755-36886288 Fax: 0755-36886277 Http://www.stsapp.com E-mail: sts@stsapp.com

Simultaneous Mode	Position	Mode	Max. 1-g SAR (W/kg)	1-g Sum SAR (W/kg)
GSM + WIFI	Body without protection shell	GSM Data	1.135	1.330
		WIFI	0.195	
GSM + Bluetooth	Body without protection shell	GSM Data	1.135	1.140
		Bluetooth	0.005	
WCDMA + WIFI	Body without protection shell	WCDMA RMC	1.148	**1.343**
		WIFI	0.195	
WCDMA + Bluetooth	Body without protection shell	WCDMA RMC	1.148	1.153
		Bluetooth	0.005	

Simultaneous Mode	Position	Mode	Max. 1-g SAR (W/kg)	1-g Sum SAR (W/kg)
GSM + WIFI	Body with protection shell	GSM Data	1.043	1.238
		WIFI	0.195	
GSM + Bluetooth	Body with protection shell	GSM Data	1.043	1.048
		Bluetooth	0.005	
WCDMA + WIFI	Body with protection shell	WCDMA RMC	1.056	**1.251**
		WIFI	0.195	
WCDMA + Bluetooth	Body with protection shell	WCDMA RMC	1.056	1.061
		Bluetooth	0.005	

Simultaneous transmission SAR test exclusion is determined for each operating configuration and exposure condition according to the reported standalone SAR of each applicable simultaneous transmitting antenna.

When the sum of SAR 1g of all simultaneously transmitting antennas in an operating mode and exposure condition combination is within the SAR limit (SAR-1g 1.6 W/kg), the simultaneous transmission SAR is not required. When the sum of SAR 1g is greater than the SAR limit (SAR-1g 1.6 W/kg), SAR test exclusion is determined by the SPLSR.

13. Equipment List

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last Calibration	Calibrated Until
835MHz Dipole	SATIMO	SID835	SN 30/14 DIP0G835-332	2014.09.01	2017.08.31
1900MHz Dipole	SATIMO	SID1900	SN 30/14 DIP1G900-333	2014.09.01	2017.08.31
2450MHzDipole	SATIMO	SID2450	SN 30/14 DIP2G450-335	2014.09.01	2017.08.31
E-Field Probe	MVG	SSE2	SN 45/15 EPGO281	2015.12.10	2016.12.09
Antenna	SATIMO	ANTA3	SN 07/13 ZNTA52	2014.09.01	2017.08.31
Waveguide	SATIMO	SWG5500	SN 13/14 WGA32	2014.09.01	2017.08.31
Phantom1	SATIMO	SAM	SN 32/14 SAM115	N/A	N/A
Phantom2	SATIMO	SAM	SN 32/14 SAM116	N/A	N/A
SAR TEST BENCH	SATIMO	GSM and WCDMA mobile phone POSITIONNING SYSTEM	SN 32/14 MSH97	N/A	N/A
SAR TEST BENCH	SATIMO	LAPTOP POSITIONNING SYSTEM	SN 32/14 LSH29	N/A	N/A
Dielectric Probe Kit	SATIMO	SCLMP	SN 32/14 OCPG52	2016.08.30	2017.08.29
Multi Meter	Keithley	Multi Meter 2000	4050073	2015.11.20	2016.11.19
Signal Generator	Agilent	N5182A	MY50140530	2015.11.18	2016.11.17
Power Meter	R&S	NRP	100510	2015.10.25	2016.10.24
Power Meter	HP	EPM-442A	GB37170267	2015.10.24	2016.10.23
Power Sensor	R&S	NRP-Z11	101919	2015.10.24	2016.10.23
Power Sensor	HP	8481A	2702A65976	2015.10.24	2016.10.23
Network Analyzer	Agilent	5071C	EMY46103472	2015.12.12	2016.12.11
Attenuator 1	PE	PE7005-10	N/A	2015.10.25	2016.10.24
Attenuator 2	PE	PE7005-3	N/A	2015.10.24	2016.10.23
Attenuator 3	Woken	WK0602-XX	N/A	2015.12.12	2016.12.11
Dual Directional Coupler	Agilent	778D	50422	2015.11.18	2016.11.17

Appendix A. System Validation Plots

System Performance Check Data (835MHz Body)

Type: Phone measurement (Complete)
Area scan resolution: dx=8mm,dy=8mm
Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm
Date of measurement: 2016-09-18
Measurement duration: 14 minutes 13 seconds

Experimental conditions.

Probe	
Phantom	Validation plane
Device Position	-
Band	835MHz
Channels	-
Signal	CW
Frequency (MHz)	835MHz
Relative permittivity (real part)	54.70
Relative permittivity	21.408187
Conductivity (S/m)	0.98
Power drift (%)	0.090000
Ambient Temperature:	22.7°C
Liquid Temperature:	22.3°C
Probe	SN 45/15 EPGO281
ConvF:	1.85
Crest factor:	1:1

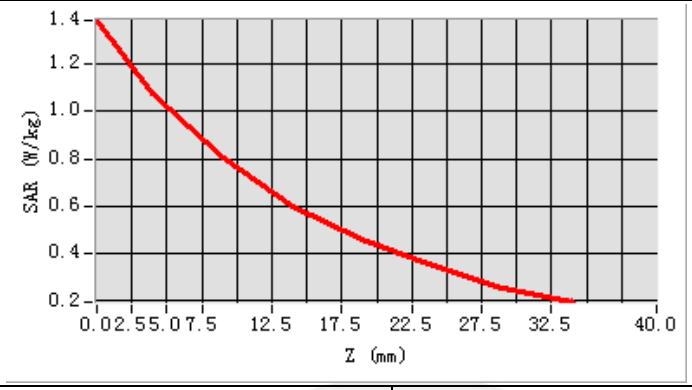
Maximum location: X=1.00, Y=0.00

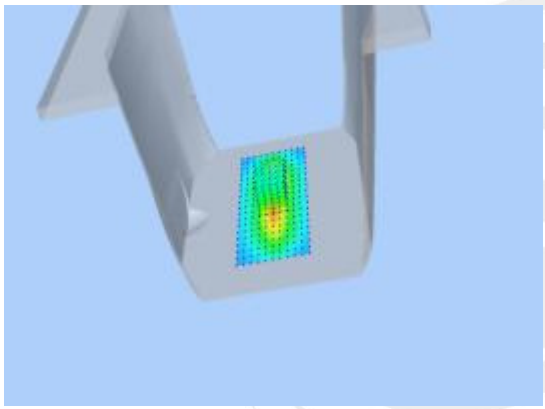
SAR Peak: 1.45 W/kg

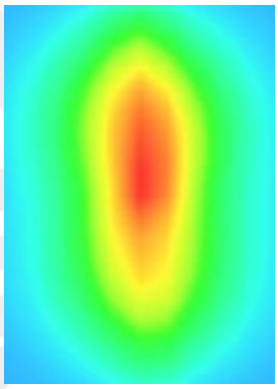
SAR 10g (W/Kg)	0.613913
SAR 1g (W/Kg)	0.941052

Z Axis Scan

Z (mm)	0	4	9	14	19	24	29
SAR(W/Kg)	1.3725	1.0058	0.6838	0.4755	0.3314	0.2365	0.1688





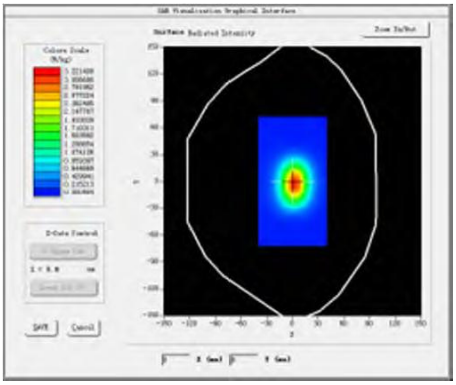
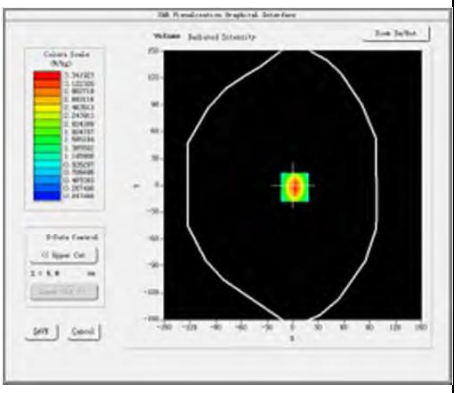


System Performance Check Data (1900MHz Body)

Type: Phone measurement (Complete)
Area scan resolution: dx=8mm,dy=8mm
Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm
Date of measurement: 2016-09-18
Measurement duration: 14 minutes 46 seconds

Experimental conditions.

Device Position	-
Band	1900MHz
Channels	-
Signal	CW
Frequency (MHz)	1900
Relative permittivity (real part)	52.31
Relative permittivity	12.87531
Conductivity (S/m)	1.5
Power drift (%)	0.37
Ambient Temperature:	22.7°C
Liquid Temperature:	22.3°C
Probe	SN 45/15 EPGO281
ConvF:	2.16
Crest factor:	1:1

SURFACE SAR	VOLUME SAR
	

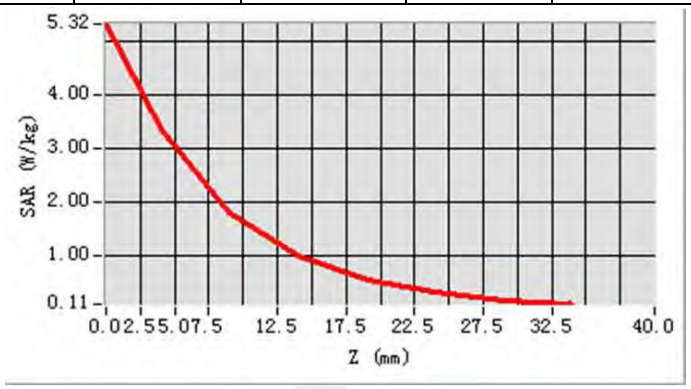
Maximum location: X=2.00, Y=2.00

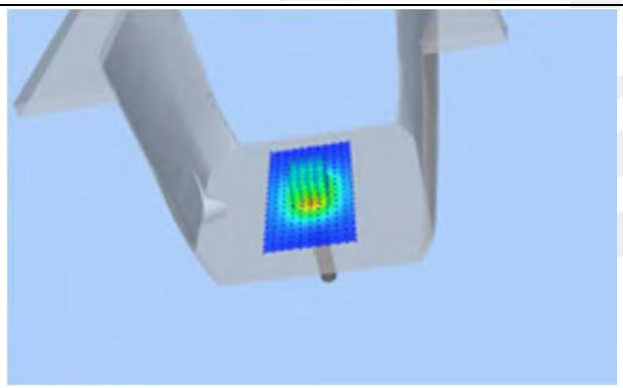
SAR Peak: 5.30 W/kg

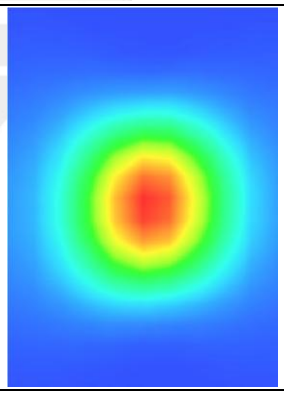
SAR 10g (W/Kg)	2.383383
SAR 1g (W/Kg)	4.160721

Z Axis Scan

Z (mm)	0	4	9	14	19	24	29
SAR(W/Kg)	5.3196	3.3419	1.8167	1.0186	0.5752	0.3285	0.1898





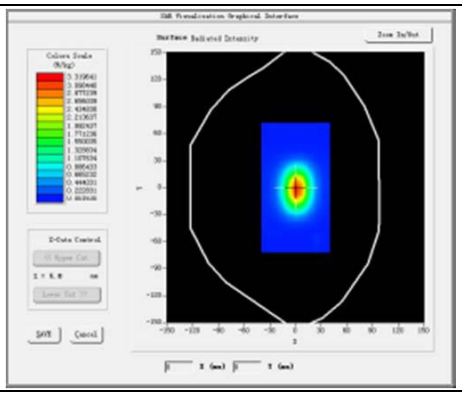
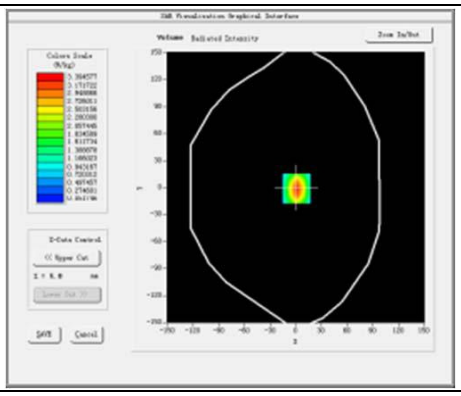


System Performance Check Data (2450MHz Body)

Type: Phone measurement (Complete)
Area scan resolution: dx=8mm,dy=8mm
Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm
Date of measurement: 2016-09-18
Measurement duration: 14 minutes 23 seconds

Experimental conditions.

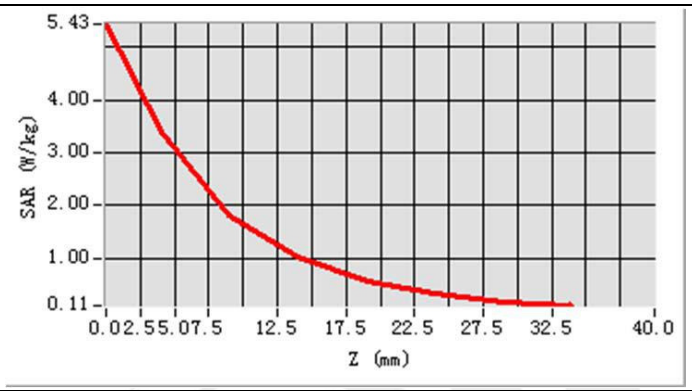
Device Position	Validation plane
Band	2450 MHz
Channels	-
Signal	CW
Frequency (MHz)	2450
Relative permittivity (real part)	52.316002
Relative permittivity	12.930000
Conductivity (S/m)	1.92
Power drift (%)	-1.200000
Ambient Temperature	22.7°C
Liquid Temperature	22.3°C
Probe	SN 45/15 EPGO281
ConvF	2.28
Crest factor:	1:1

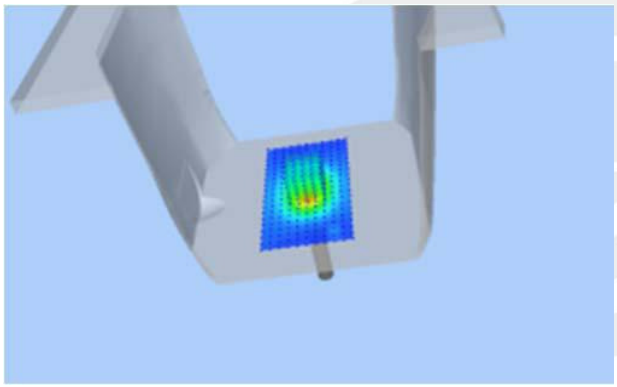
SURFACE SAR	VOLUME SAR
	

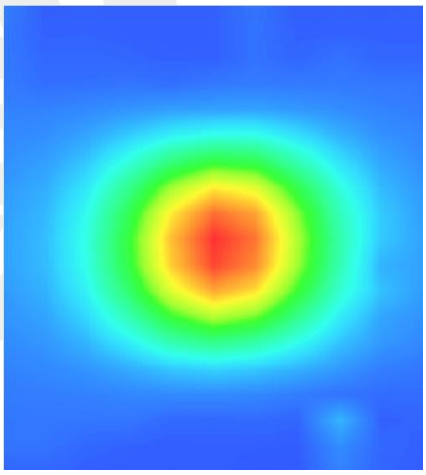
Maximum location: X=3.00, Y=1.00

SAR 10g (W/Kg)	2.338810
SAR 1g (W/Kg)	5.316861

Z Axis Scan







Appendix B. SAR Test Plots

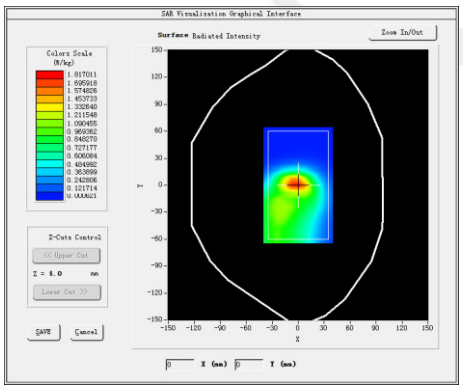
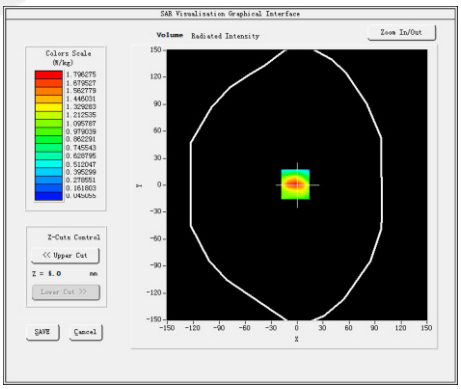
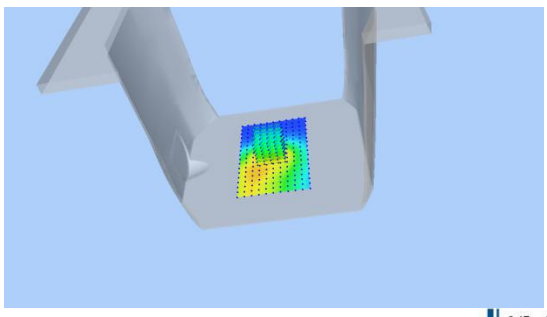
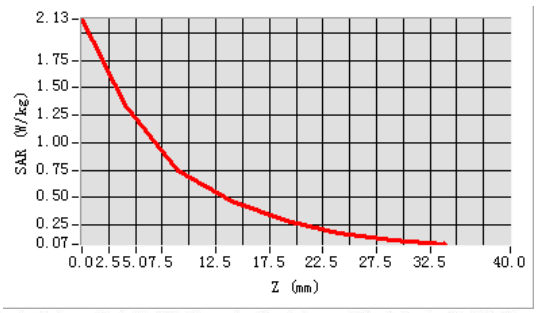
Plot 1: DUT: Tablet PC; EUT Model: M1015GR

Test Date	2016-09-18
Ambient Temperature(°C)	22.70
Liquid Temperature(°C)	22.30
Probe	SN 45/15 EPGO281
ConvF	1.85
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm, Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body back side
Band	GPRS 850
Channels	Low
Signal	Duty Cycle: 1:2.00 (Crest factor: 2.0)
Frequency (MHz)	824.2
Relative permittivity (real part)	55.20
Conductivity (S/m)	0.97
Variation (%)	1.47

Maximum location: X=8.00, Y=-40.00

SAR Peak: 2.10 W/kg

SAR 10g (W/Kg)	0.588922
SAR 1g (W/Kg)	1.101935

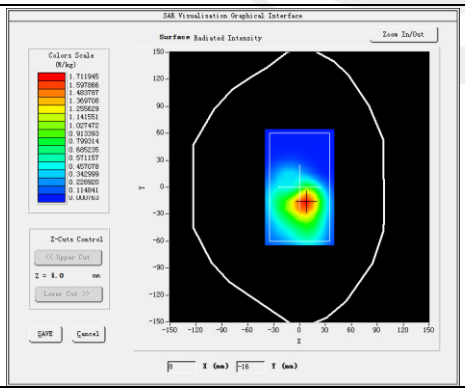
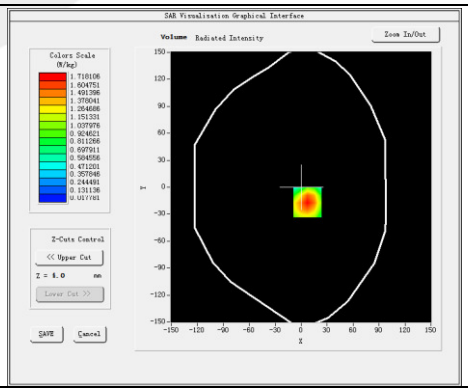
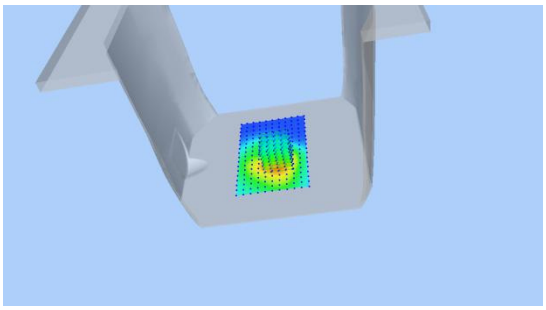
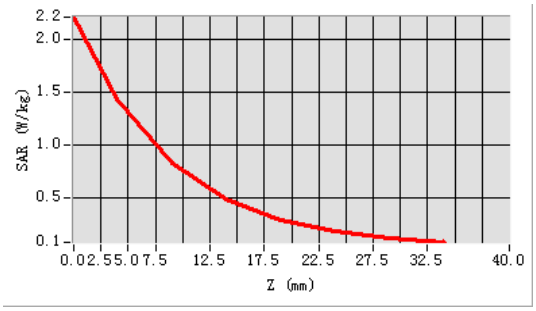
SURFACE SAR	VOLUME SAR
	
3D screen shot	**Z Axis Scan**
	

Plot 2: DUT: Tablet PC; EUT Model: M1015GR

Test Date	2016-09-18
Ambient Temperature(°C)	22.70
Liquid Temperature(°C)	22.30
Probe	SN 45/15 EPGO281
ConvF	2.16
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm, Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body back side
Band	GPRS 1900
Channels	Low
Signal	Duty Cycle: 1:2.66 (Crest factor: 2.0)
Frequency (MHz)	1850.2
Relative permittivity (real part)	53.30
Conductivity (S/m)	1.52
Variation (%)	-1.41

Maximum location: X=7.00, Y=-17.00
SAR Peak: 2.20 W/kg

SAR 10g (W/Kg)	0.725578
SAR 1g (W/Kg)	1.114785

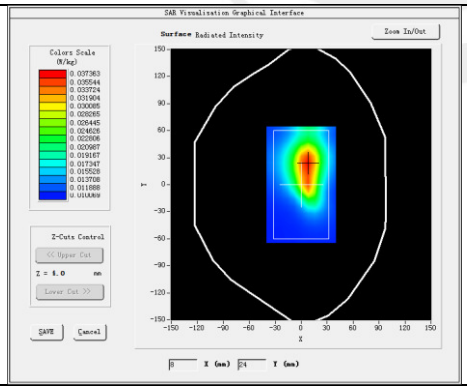
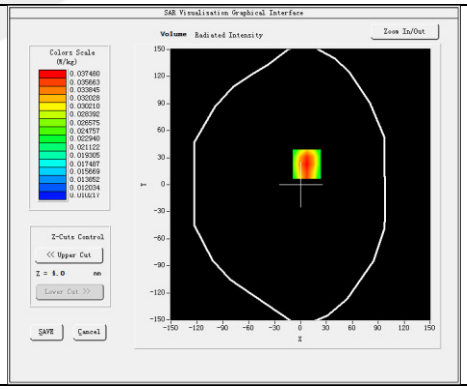
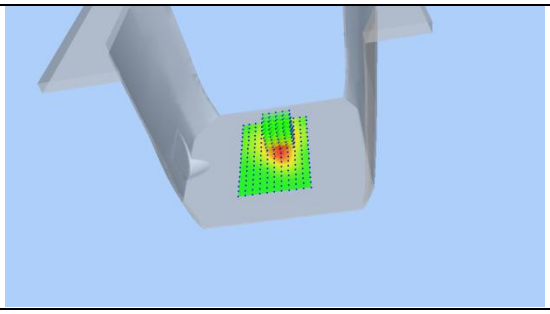
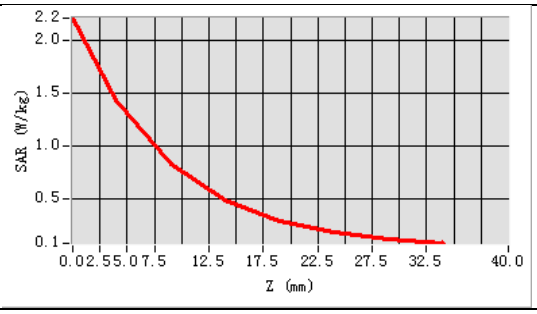
SURFACE SAR	VOLUME SAR
	
3D screen shot	**Z Axis Scan**
	

Plot 3: DUT: Tablet PC; EUT Model: M1015GR

Test Date	2016-09-18
Ambient Temperature(°C)	22.70
Liquid Temperature(°C)	22.30
Probe	SN 45/15 EPGO281
ConvF	2.16
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm, Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body back side
Band	WCDMA II
Channels	Low
Signal	WCDMA (Crest factor: 1.0)
Frequency (MHz)	1852.4
Relative permittivity (real part)	39.71
Conductivity (S/m)	1.40
Variation (%)	-1.11

Maximum location: X=7.00, Y=24.00
SAR Peak: 2.16 W/kg

SAR 10g (W/Kg)	0.693217
SAR 1g (W/Kg)	1.124190

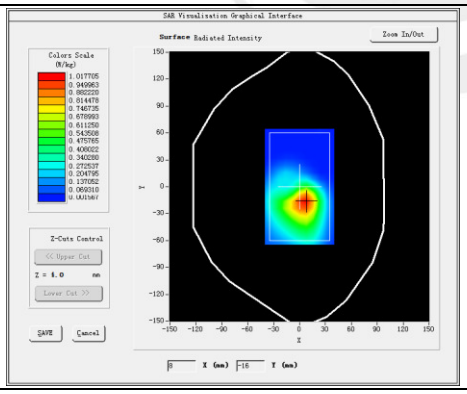
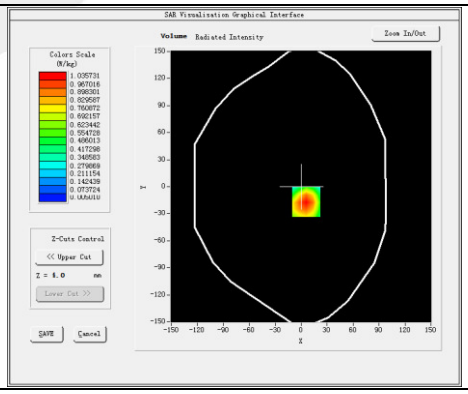
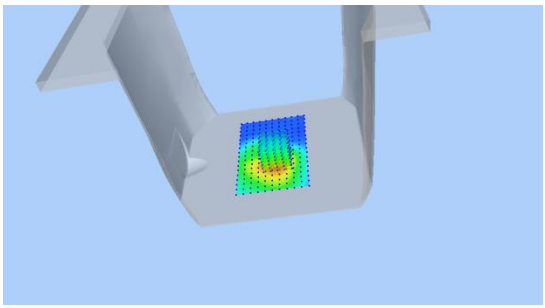
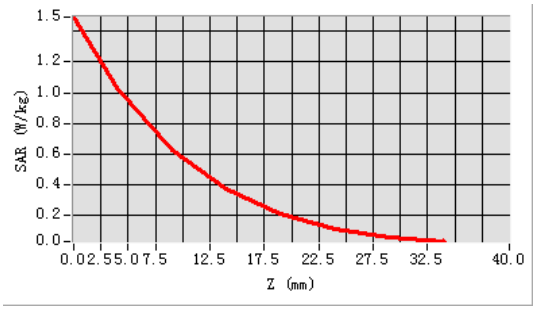
SURFACE SAR	VOLUME SAR
	
3D screen shot	**Z Axis Scan**
	

Plot 4: DUT: Tablet PC; EUT Model: M1015GR

Test Date	2016-09-18
Ambient Temperature(°C)	22.70
Liquid Temperature(°C)	22.30
Probe	SN 45/15 EPGO281
ConvF	1.85
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm, Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body back side
Band	WCDMA V
Channels	Middle
Signal	WCDMA (Crest factor: 1.0)
Frequency (MHz)	836.6
Relative permittivity (real part)	55.5
Conductivity (S/m)	0.96
Variation (%)	-0.69

Maximum location: X=6.00, Y=-17.00
SAR Peak: 1.52 W/kg

SAR 10g (W/Kg)	0.558488
SAR 1g (W/Kg)	0.977711

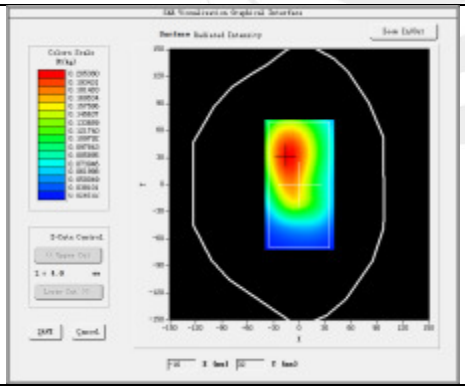
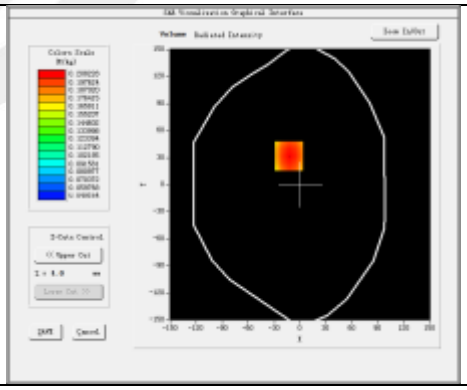
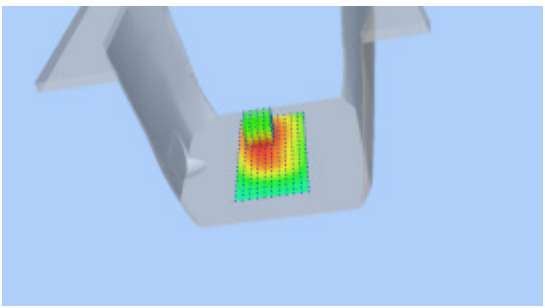
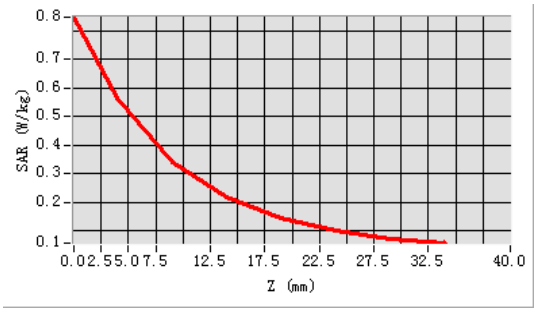
SURFACE SAR	VOLUME SAR
	
3D screen shot	**Z Axis Scan**
	

Plot 5: DUT: Tablet PC; EUT Model: M1015GR

Test Date	2016-09-18
Probe	SN 45/15 EPGO281
ConvF	2.28
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm, Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body back side
Band	IEEE 802.11b ISM
Channels	High
Signal	IEEE802.b (Crest factor: 1.0)
Frequency (MHz)	2462
Relative permittivity (real part)	52.40
Conductivity (S/m)	1.94
Variation (%)	-2.64

Maximum location: X=-13.00, Y=32.00
SAR Peak: 0.80 W/kg

SAR 10g (W/Kg)	0.079167
SAR 1g (W/Kg)	0.193822

SURFACE SAR	VOLUME SAR
	
3D	**Z Axis Scan**
	

Appendix C. Probe Calibration And Dipole Calibration Report

Refer the appendix Calibration Report.

※※※※※END OF THE REPORT※※※※※